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WEAK-TO-MODERATE CORRELATIONS BETWEEN GLOBAL GEOMAGNETIC ACTIVITY AND REPORTS OF DIMINISHED PLEASANTNESS: A NONSPECIFIC SOURCE FOR MULTIPLE BEHAVIORAL CORRELATES?[1]

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Summary.—In two previous experiments the ratings of the pleasantness of the experiences for a total of 45 subjects tested within a specific experimental setting were negatively correlated (*rho*s about –.35 to –.40) with the global geomagnetic activity on the days of the ratings. In the present analysis, subjective ratings from a comparable experiment completed 13 years ago were also negatively correlated (*rho* = –.50) with the global geomagnetic activity on the days of the experiences. The consistency of these results suggests a common neurophysiological process that generates hedonistic affect with which the multiple types of behaviors, such as aggression, homicide, traffic fatalities, epileptic seizures, and industrial accidents, are correlated. Consequently these apparently "divergent" behaviors are correlated with geomagnetic activity because they are correlated with a central neurophysiological process which may be sensitive to increases in geomagnetic activity.

During the last century dozens of researchers (Persinger, 1980; Cherry, 2002) have reported statistically significant correlations between a wide variety of apparently unrelated behaviors and increased variations in the daily *global* or planetary geomagnetic activity (Campbell, 1997) within the mHz to Hz range at peak-to-peak intensities above between 20 nT and 50 nT. The behaviors include increased rates of traffic deaths, convulsions, suicides, aggressive behavior, sleep disturbances, and sudden unexpected death from cardiac failures. These diverse behaviors may be correlated with geomagnetic activity because they are related to a singular nonspecific factor which is particularly sensitive to this global condition.

Persinger, Richards, and Koren (1994) found a statistically significant negative correlation (*rho* = –.40, *r* = –.30) between the intensity of the daily value of global geomagnetic activity as measured by the aa (average antipodal) index and the ratings of pleasantness of experiences by volunteers who were stimulated with long-term potentiation magnetic fields (1 microT) over the right hemisphere during partial sensory deprivation. The 5-point rating scale, with descriptors, includes –2 (very negative), –1 (mildly negative), 0 (neutral), +1 (mildly positive), and +2 (very positive). Recently, Sculthorpe

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and Persinger (2003) reported that the ratings of the pleasantness of experiences while subjects were exposed to different patterns of weak complex magnetic fields but of comparable intensities were negatively correlated ($r = -.36$) with the average global geomagnetic activity (A values) during the 24-hr. period of the experiment.

To test the generalizability of this association, unpublished data collected in 1990 and found during a review of our 30-yr.-old database were analyzed. They had been collected for 12 women and 10 men, between 19 and 22 years old, who were enrolled in a first-year university psychology course. The subjects had been exposed to similar procedures to discern if a 1-microT burst-firing magnetic field, when applied bilaterally once every 4 sec. across the temporal lobes, could influence thinking. The subjects (in all three experiments) were naive to the experimental setting. The mean and standard deviation for the subjective ratings of unpleasantness–pleasantness from the 1990 study were .45 and .88, while the mean and standard deviation for the aa values on the days of the experiences were 50 nT and 22 nT, respectively.

The Spearman *rho* correlations between the ratings of unpleasantness–pleasantness and the geomagnetic activity the day before and the day of the ratings were –.18 and –.56 ($p < .01$), respectively. When the shared association between the geomagnetic activity between the day of the experience and the day before was removed by partial correlation, the association between the geomagnetic activity on the day of the rating and the score was still significant (partial $r_{17} = -.40$, $p < .05$).

If these results are generalizable, then increased geomagnetic activity during periods of partial sensory deprivation and enhanced transcerebral stimulation from weak, complex magnetic fields within the 1 microT or less range may decrease the general pleasantness of affect. Natural processes that are similar to the experimental condition include dreaming and altered states that peak between 02 hr. and 04 hr. local time. Because the three groups of subjects were exposed to different patterns (but of comparable intensities) of complex magnetic fields, the specific configuration may not be relevant.

Periods of diminished positive affect, that might be considered a type of "withdrawal" from the person's normal hedonistic state, could increase the probability of irritability, diminished vigilance, and attenuated inhibition from prefrontal functions resulting in multiple, apparently unrelated, but clear endpoints. Even if the geomagnetic effect influenced less than 1% of the earth's population, its impact would be epidemiologically evident and relevant. If this commonality is valid, then involvement of the amygdaloid-dorsomedial thalamic-prefrontal pathways of the right hemisphere would be implicated.

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